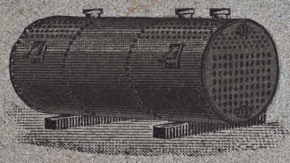
E. KEELER COMPANY

WILLIAMSPORT, PA. ← ← ← U.S.A.



ESTABLISHED 1865

E. KEELER COMPANY

WILLIAMSPORT, PA., U. S. A.

NEW YORK BOSTON PHILADELPHIA CHICAGO

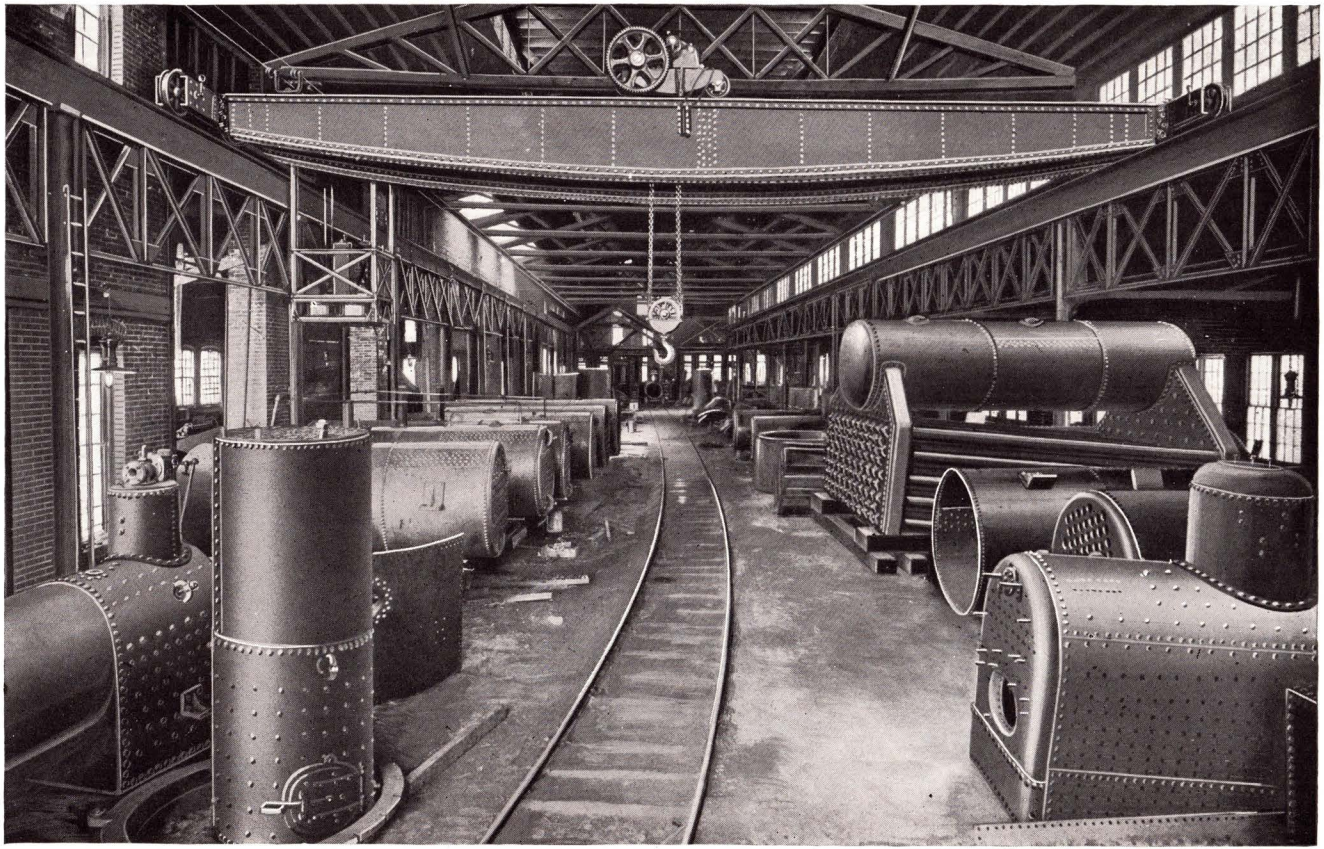
Manufacturers of

Fire and Water-Tube Boilers
Self-Supporting Steel Stacks
Tanks and Standpipes
Riveted Steel Pipe
Complete Power Plants

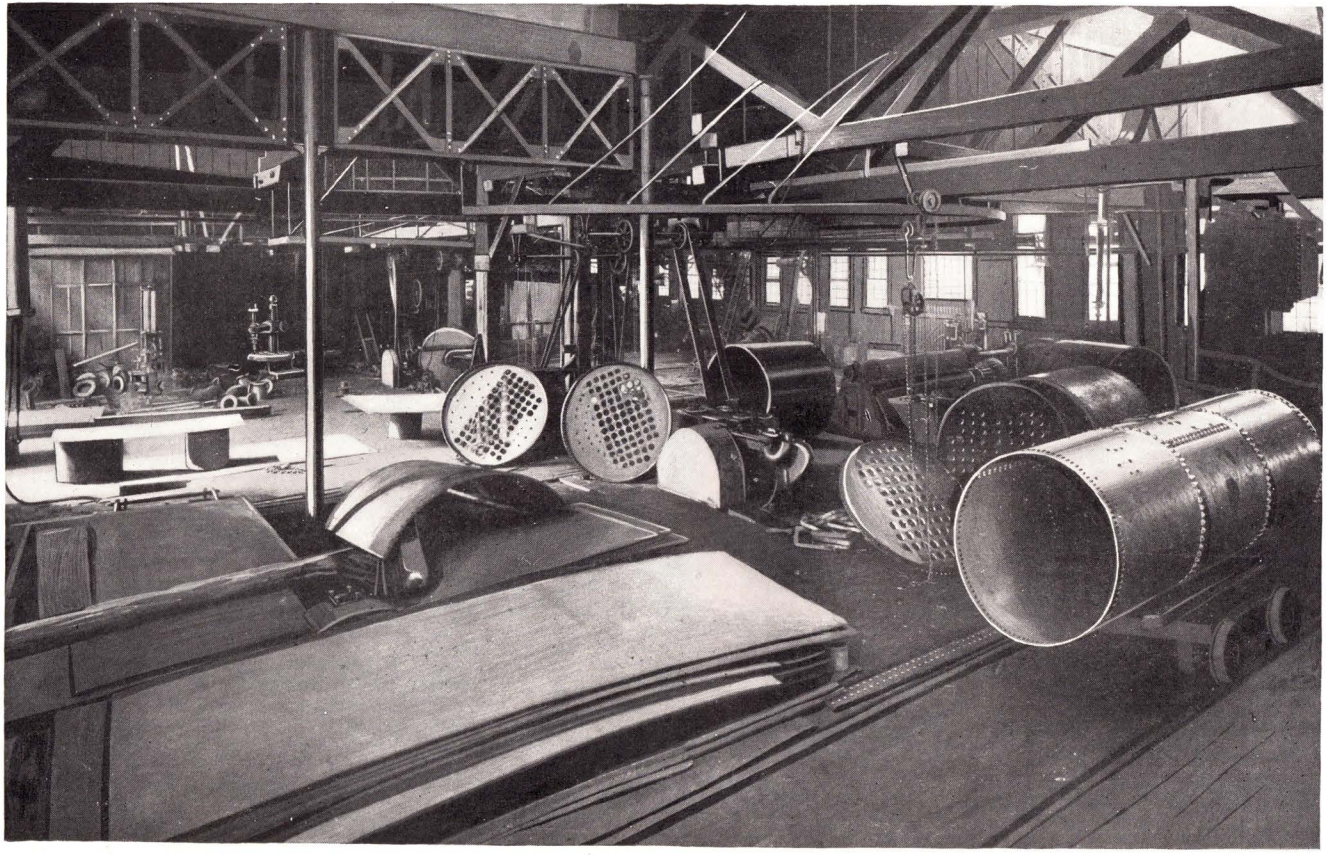
CONTRACTING ENGINEERS

STEAM FITTING AND HEAVY PIPE WORK

GIES & CO., PRINTERS AND ENGRAVERS, BUFFALO, N. Y.



South End of Erecting Shop



West End of Main Shop

In addition to the standard forms of boilers, tank and sheet-iron work shown on the succeeding pages, we build water-tube boilers of the most approved design, illustrated in a separate catalogue.

We have had 35 years' experience in installing complete power plants, including boilers, engines, shafting, feed-water heaters, pumps and steam fitting. In taking such contracts we guarantee the successful working of the entire plant, insuring the highest degree of efficiency, and saving the expense and annoyance of a divided responsibility.

Since our establishment in 1865, we have made but one grade of boilers, and the steady growth of our trade at home and abroad is an evidence of the popular appreciation of a standard grade of excellence, at the lowest price consistent with first-class material and workmanship.

Our equipment includes the most improved labor-saving machinery, complete hydraulic flanging and riveting plants, annealing furnaces, hydraulic, electric and pneumatic cranes, pneumatic caulkers, heavy-duty bending rolls, punches, shears, etc.

Our heating engineers have made a special study of the exhaust-steam and hot-water systems, and a corps of competent steam fitters are ready to go any distance on short notice.

We carry in stock a full line of mill and engine supplies, shown in a special catalogue.

Material—Our boilers are made of flange or fire-box steel of standard make; the tubes are either charcoal iron or soft steel.

Riveting—The seams of a boiler being its weakest part, the quality, spacing and driving of the rivets are of the utmost importance. Rivets are of Burden or Sternbergh make, driven by a hydraulic machine or by hand, as may be desired. Spacing of rivets conforms to best practice to secure greatest pressure allowed.

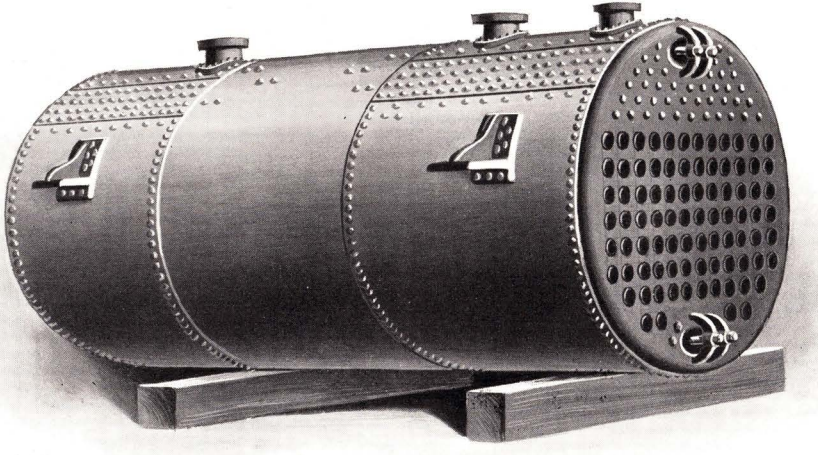
Flanging—We have recently installed hydraulic machinery of the latest design for flanging boiler heads, and an annealing furnace admitting heads 15 feet in diameter. The head is taken from the furnace at a mild white heat, and the machine turns the entire flange without a flaw and at a thickness uniform with the original plate.

Tube Holes—Although a much more expensive operation, we always drill and never punch our tube holes. Punching strains the steel, leaving it in a weakened condition and susceptible to cracks.

Staying—Braces are of solid crow-foot type, of the best refined iron or pressed weldless braces, properly proportioned in size and number.

Caulking—All caulking done with blunt tool, thus avoiding injury to lower sheet.

Testing—Our boilers are tested to 150 lbs. hydrostatic pressure before leaving our works.



Horizontal Tubular Boiler

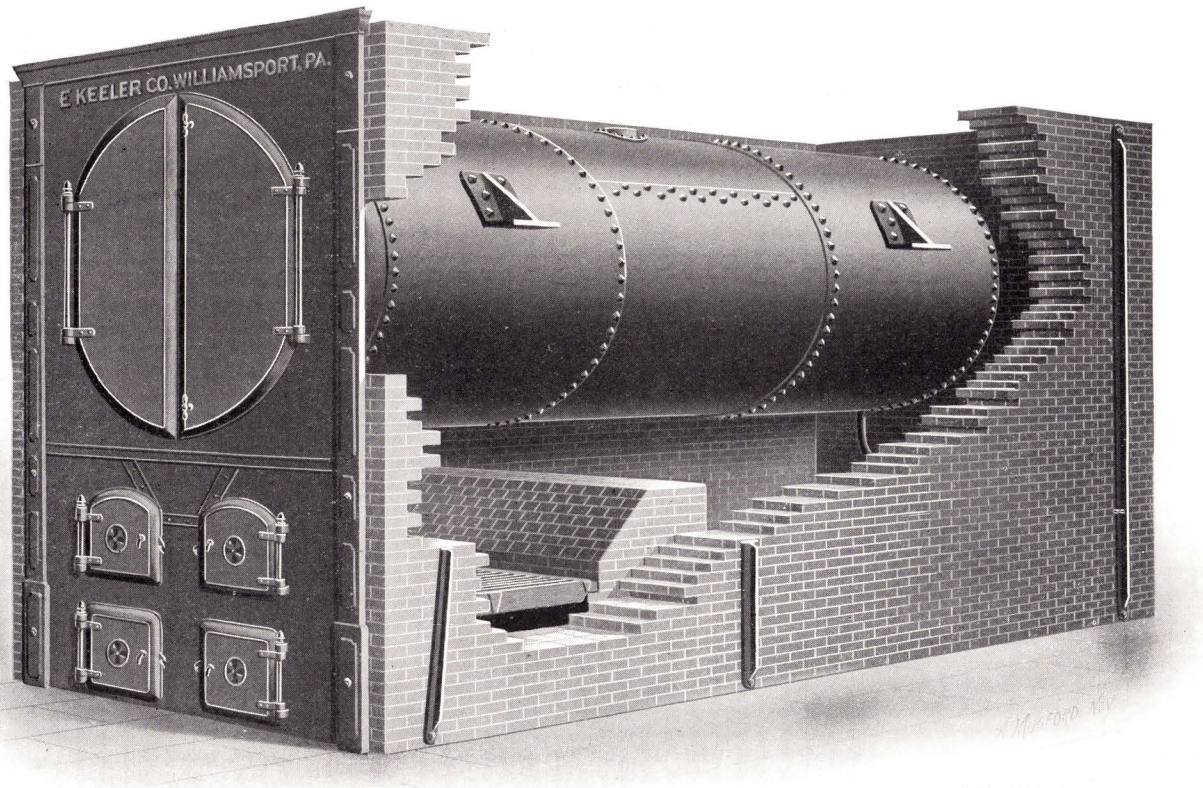
With double-butt strap, triple-riveted straight seams, for high pressure

High-Pressure Tubular Boiler

Double-butt strap, triple-riveted straight-seam boiler, made in two or three courses. Manhole in front head, above and below tubes, unless otherwise ordered. Manholes are of internal flanged type; four, six or eight heavy cast side brackets for support. Heads are strongly braced with solid crowfoot or weldless braces. Standard size tubes are specified, but we will furnish larger size without additional cost. Our boiler fixtures include: Full-flush or half-arch front, oval stack plate, grate bars, bearing, covering and back tee bars, dead plate, arches and liners, cleaning door and frame, buck stays and bolts, anchor bolts, wall plates and rolls, steam gauge, water column, water gauge, gauge cocks, safety, check, globe and blow-off valves, whistle and pipe.

SPECIFICATIONS:

Number of Size	1	2	3	4	5	6	7	8	9	10	11	12
Horse-power	50	60	70	75	80	85	100	110	125	150	175	200
Diameter of boiler, inches	54	54	60	60	60	66	66	66	72	72	78	84
Length of tubes, feet	12	14	14	15	16	14	16	18	16	18	18	18
Number 3-inch tubes	58	58	76	76	76	94	94	94	116	116	140	166
Number $3\frac{1}{2}$-inch tubes	46	46	60	60	60	76	76	76	94	94	114	134
Number 4-inch tubes	38	38	50	50	50	60	60	60	74	74	90	106
Thickness of shell	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{43}{100}$	$\frac{43}{100}$	$\frac{43}{100}$	$\frac{47}{100}$	$\frac{47}{100}$	$\frac{1}{2}$	$\frac{53}{100}$
Thickness of heads	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{5}{8}$
Diameter of dry pipe, inches	4	4	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	5	5	5	5
Length of dry pipe, inches	72	72	84	84	84	84	96	96	96	108	108	108
Weight of boiler, about	7950	9350	10680	11200	12000	13900	15000	16600	18600	21500	25500	27500
Weight of boiler fixtures	4450	4850	5120	5400	5600	5800	6200	6400	7400	7700	9000	10000
Weight of boiler and fixtures	12400	14200	15800	16600	17600	19700	21200	23000	26000	29200	34500	37500



Tubular Boiler

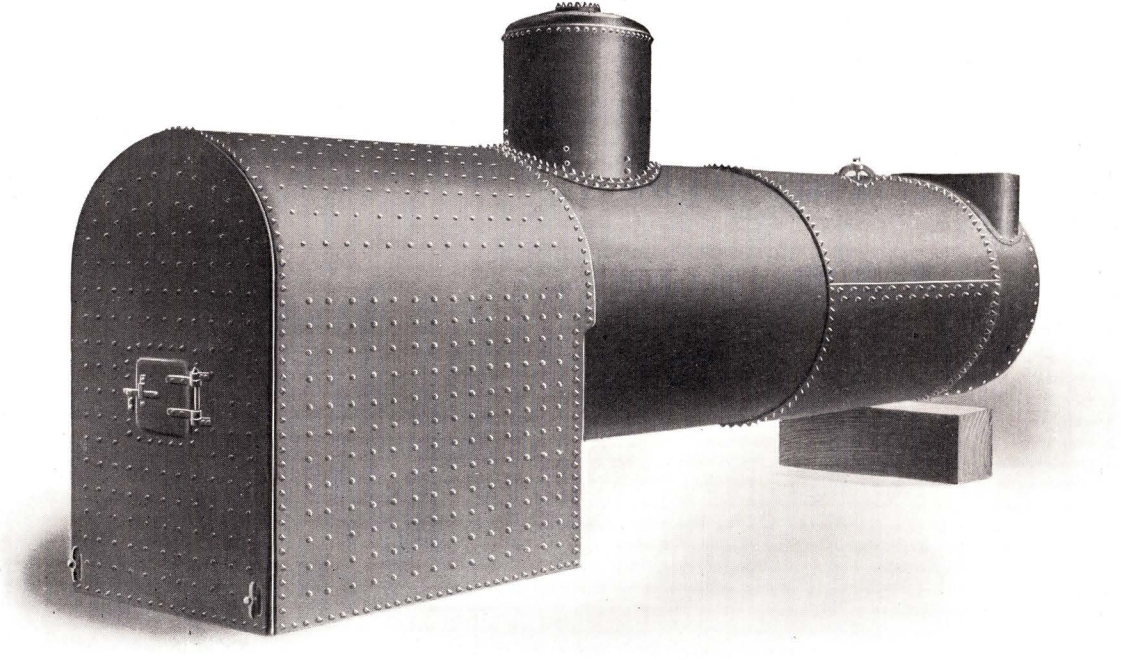
With full-flush front

Tubular Boiler, with Full-Flush or Half-Arch Front

Double-riveted straight seams. Sizes 1 to 6 have handhole below tubes in front head, manhole in dome. Sizes 7 to 11 have manhole below tubes in front head, manhole in dome. Sizes 12 to 14 have two manholes in front head, and handhole in rear head below tubes when required, and are made without dome unless otherwise ordered. We furnish regular boiler fixtures, including: Full-flush or half-arch front, oval stack plate, grate bars, bearing, covering and back tee bars, dead plate, arches and liners, cleaning door and frame, buck stays and bolts, anchor bolts, wall plates and rolls, water column and gauge, steam gauge, gauge cocks, safety, check, globe and blow-off valves, whistle and pipe, stack and guy wire.

SPECIFICATIONS:

Number of Size	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Horse-power	15	20	25	30	35	40	45	50	60	70	80	100	125	150
Diameter of boiler, inches	36	36	42	44	44	44	48	54	54	60	60	66	72	72
Length of tubes, feet	8	10	10	10	12	14	14	12	14	14	16	16	16	18
Number of 3-inch tubes	28	28	38	46	46	46	46	58	58	76	76	94	116	116
Number of $3\frac{1}{2}$-inch tubes	.....	.....	28	34	34	34	38	46	46	60	60	76	94	94
Number of 4-inch tubes	.....	.....	22	28	28	28	30	38	38	50	50	60	74	74
Thickness of shell	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{9}{32}$	$\frac{9}{32}$	$\frac{9}{32}$	$\frac{9}{32}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{43}{100}$	$\frac{7}{16}$	$\frac{7}{16}$
Thickness of heads	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{9}{16}$
Diameter of dome, inches	20	20	22	22	22	26	26	30	32	32	32	36	36	36
Height of dome, inches	22	22	24	24	24	28	28	34	36	36	36	40	40	40
Diameter of stack, inches	16	16	20	22	22	24	24	26	28	28	28	30	34	36
Length of stack, feet	28	35	35	35	40	50	50	40	50	50	60	60	60	60
Weight of boiler, about	2700	3200	4250	4650	5200	6300	7150	7750	9150	10480	11900	14400	16600	17900
Weight of boiler fixtures	2000	2700	3250	3450	3700	4100	4250	4450	4850	5120	5600	6200	7400	7700
Weight of boiler and fixtures	4700	5900	7500	8100	8900	10400	11400	12200	14000	15600	17500	20600	24000	25600



Portable Boiler

Open bottom

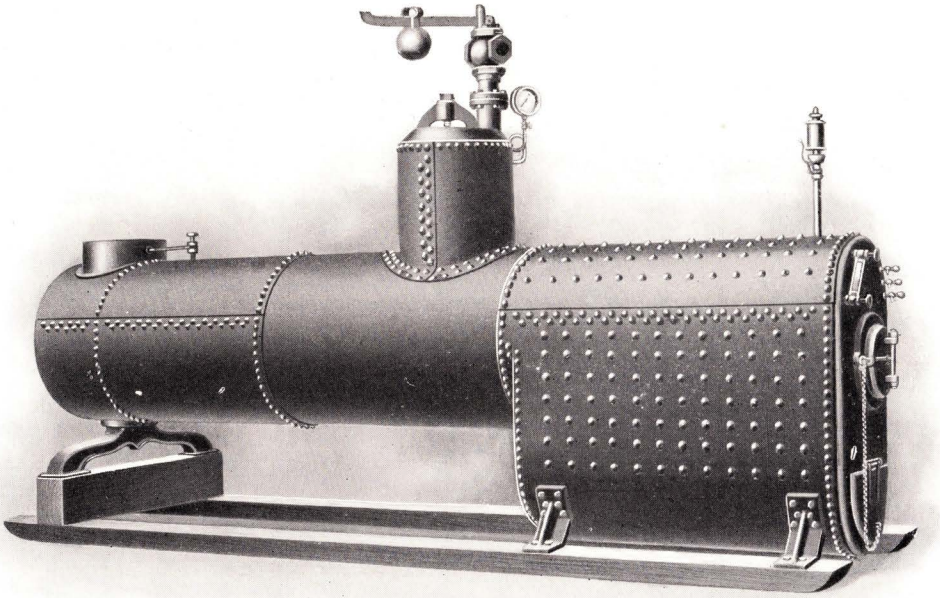
Open-Bottom Portable Boiler

All longitudinal seams double riveted. Dome double riveted to shell. Handhole around water leg and one manhole in shell of boilers 30 horse-power and larger. An additional price is charged when this boiler is mounted on skids.

Boiler fixtures include: Smoke stack and guy wire (four times the length of stack), grates, steam and water gauges, gauge cocks, whistle, safety, blow-off, check and feed valves.

SPECIFICATIONS:

Number of Size	1	2	3	4	5	6	7	8	9	10	11	12
Horse-power	15	20	25	30	40	50	60	70	80	100	125	150
Diameter of boiler, inches	32	34	36	40	44	48	52	52	56	60	66	72
Length of fire box, inches	38	48	52	52	52	60	60	63	63	66	72	78
Width of fire box, inches	26	28	30	34	38	42	46	46	50	54	58	64
Height of fire box, inches	38	38	40	44	50	52	54	54	60	62	64	68
Number 3-inch tubes	24	30	34	38	46	53	64	64	76	85	108	140
Length of tubes, inches	84	96	96	102	114	132	126	144	144	180	180	168
Thickness of shell	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{9}{32}$	$\frac{9}{32}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{11}{32}$	$\frac{3}{8}$	$\frac{43}{100}$	$\frac{43}{100}$
Thickness of fire box	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{3}{8}$
Thickness of heads	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{1}{2}$
Diameter of dome, inches	16	17	18	20	22	24	28	28	30	32	34	36
Height of dome, inches	18	20	22	22	24	26	30	30	30	30	30	28
Diameter of stack, inches	15	16	18	20	22	24	26	26	28	30	32	38
Length of stack, feet	24	28	28	30	32	38	36	42	42	52	52	50
Weight with fixtures, about	4400	5300	6000	7000	8400	11000	12000	13300	15300	19000	23000	27000



Portable Boiler

Water bottom

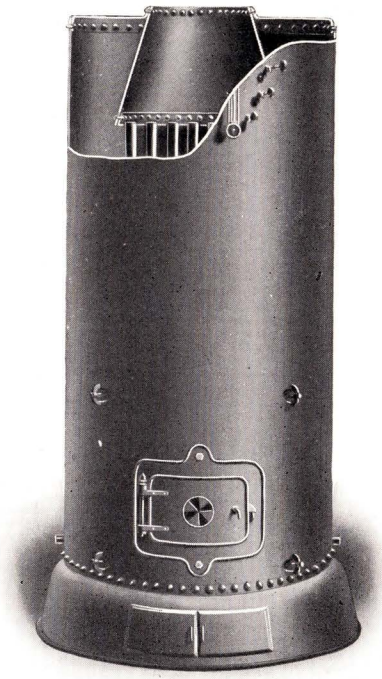
Water-Bottom Portable Boiler

Fixtures consist of: Grates, bearing bars, steam and water gauge, gauge cocks, whistle and pipe, safety, blow-off, check and globe valves, smoke stack and guy wire.

SPECIFICATIONS:

Number of Size	1	2	3	4	5	6	7	8	9	10
Horse-power	15	20	25	30	40	50	60	70	80	100
Diameter of boiler, inches	32	34	36	40	44	48	52	52	56	60
Length of fire box, inches	38	48	52	52	52	60	60	63	63	66
Width of fire box, inches	26	28	30	34	38	42	46	46	50	54
Height of fire box, inches	38	38	40	44	50	52	54	54	60	62
Number of 3-inch tubes	24	30	34	38	46	53	64	64	76	85
Length of tubes, inches	84	96	96	102	114	132	126	144	144	180
Thickness of shell	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{9}{32}$	$\frac{9}{32}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{11}{32}$	$\frac{3}{8}$
Thickness of fire box	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$
Thickness of heads	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{7}{16}$
Diameter of dome, inches	16	17	18	20	22	24	28	28	30	32
Height of dome, inches	18	20	22	22	24	26	30	30	30	30
Diameter of stack, inches	15	16	18	20	22	24	26	26	28	30
Length of stack, feet	24	28	28	30	32	38	36	42	42	52
Weight with fixtures, about	4600	5700	6300	7500	9000	12000	13000	14000	16000	20800

Upright Tubular Boiler



Upright Tubular Boiler
With submerged tubes

Upright Tubular Boiler

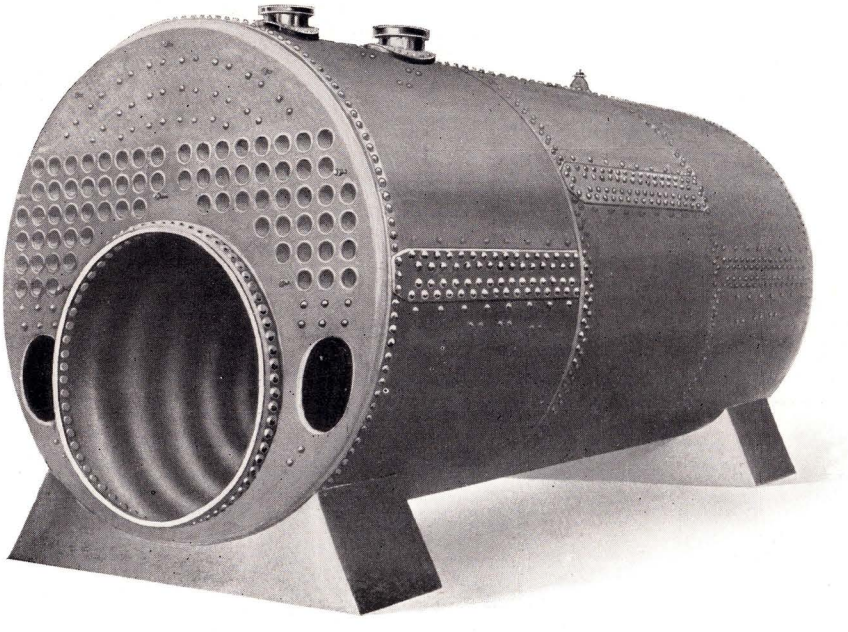
Shell of boiler made of best flange steel, fire box and heads of flange or fire-box steel. Large handholes above the crown sheet and in bottom of shell allow free access for cleaning out. The fire box and smoke chamber are stay-bolted to shell. The fixtures consist of: Base, grates, hood, steam and water gauge, gauge cocks, safety, blow-off, check and stop valves.

SPECIFICATIONS:

Number of Size	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Horse-power	5	6	7	9	12	15	18	23	27	31	36	41	47	50	60
Diameter of boiler, inches	24	24	30	30	30	36	36	42	42	42	48	48	48	54	60
Height of boiler, feet	5	6	5	6	7	7	8	8	9	10	9	10	11	10	11
Diameter of furnace, inches	20	20	25	25	25	31	31	37	37	37	43	43	43	48	55
Height of furnace, inches	24	24	27	27	27	27	27	33	33	33	33	33	33	33	36
Thickness of shell and furnace, inches	1/4	1/4	1/4	1/4	1/4	9/32	9/32	9/32	9/32	9/32	5/16	5/16	5/16	11/32	3/8
Thickness of heads, inches	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	7/16
Length of tubes, inches	36	48	33	45	57	57	69	63	75	87	75	87	99	87	96
Number of 2-inch tubes	31	31	50	50	50	68	68	88	88	88	124	124	124	150	171
Weight complete, about	1400	1600	1760	2100	2300	3000	3300	4000	4300	4600	5700	6100	6500	7500	9000

With Submerged Tubes

Number of Size	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Horse-power	5	6	8	10	12	15	18	20	25	30	35	40	45	50	60
Diameter of boiler, inches	24	24	30	30	36	36	36	42	42	42	48	48	48	54	54
Height of boiler, feet	6	6½	6	6½	6½	7	8	7½	8	9	9	9½	10	9½	10½
Diameter of fire box, inches	20	20	25	25	31	31	31	37	37	37	43	43	43	48	48
Height of fire box, inches	24	24	27	27	27	27	27	30	30	30	30	30	30	30	30
Height of cone, inches	15	15	15	15	18	18	18	24	24	24	27	27	27	30	30
Thickness of shell, inches	1/4	1/4	1/4	1/4	1/4	1/4	1/4	9/32	9/32	9/32	5/16	5/16	5/16	5/16	5/16
Thickness of heads, inches	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	7/16	7/16	7/16	7/16	7/16
Thickness of fire box and cones, inches	9/32	9/32	9/32	9/32	9/32	9/32	9/32	9/32	9/32	9/32	5/16	5/16	5/16	5/16	5/16
Length of tubes, inches	33	39	30	36	33	39	51	36	42	54	51	57	63	54	66
Number of 2-inch tubes	28	28	50	50	75	75	75	110	110	110	146	146	146	194	194
Weight complete, about	1600	1700	2200	2300	3100	3200	3400	4200	4400	4800	6700	6900	7100	8500	9000



Marine, or Internal-Furnace, Boiler

Marine, or Internal-Furnace, Boiler

ESPECIALLY DESIGNED FOR HIGH-PRESSURE DUTY

The high-pressure and heavy-duty engine has created a demand for a boiler which, with the maximum degree of safety, can generate steam with minimum consumption of coal. The Internal-Furnace Boiler, a modification of the marine or Scotch type, was designed to meet this demand, being built to stand a pressure varying from 130 to 200 lbs.

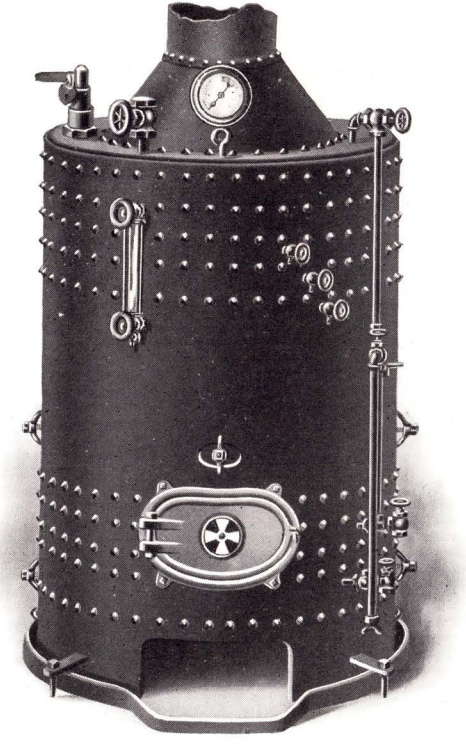
This boiler is built with a horizontal cylindrical shell, having an internal suspension or corrugated furnace. The grates are in the front of the furnace, the rear end terminating in a combustion chamber, consisting of a firebrick-lined extension of the boiler shell. The general proportions of the furnace were experimentally and practically determined, and have proved to offer the greatest resistance to distortion or collapse, permitting a free expansion and contraction without undue strain in any part. The construction of this boiler makes it easy to clean and comparatively free from lodgment of scale.

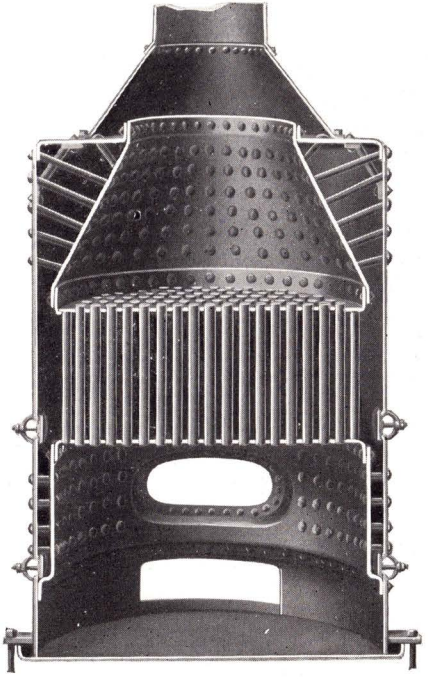
Internal-Furnace Boilers are economical in first cost, as they are self-contained, and being independent of masonry setting, cast-iron fronts etc., are easily moved. They are economical in coal consumption, as there is no brick work to absorb heat, and the corrugated furnace being surrounded by water, the heat of combustion is utilized to a greater extent than is practicable with boilers having external furnaces contained within brick-wall settings.

Fixtures include : Boiler support, stack, grates, firing tools, steam and water gauges, gauge cocks, whistle, "pop" safety and blow-off valves.

SPECIFICATIONS FOR 130 LBS. PRESSURE:

NUMBER OF SIZE	1	2	3	4	5	6	7
Horse-power	75	100	125	150	200	250	300
Grate surface	15	20	25	30	40	50	60
Number $3\frac{1}{2}$-inch tubes	42	56	70	80	108	137	161
Length of tubes, feet	$11\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	13	$12\frac{1}{2}$	$12\frac{1}{2}$	13
Inside diameter boiler shell, feet	$6\frac{1}{2}$	7	$7\frac{1}{2}$	8	$9\frac{1}{2}$	$10\frac{1}{2}$	$11\frac{1}{2}$
Inside diameter corrugated furnace, inches	36	38	45	50	38	45	50
Length of grate	5 ft.	6 ft. 4 in.	6 ft. 8 in.	7 ft. 3 in.	6 ft. 4 in.	6 ft. 8 in.	7 ft. 3 in.
Depth of combustion chamber, feet	2	2	2	2	2	2	2
Length of boiler over all	14 ft. 9 in.	15 ft. 8 in.	15 ft. $8\frac{1}{4}$ in.	16 ft. $2\frac{1}{4}$ in.	15 ft. $9\frac{1}{2}$ in.	15 ft. $9\frac{1}{2}$ in.	16 ft. 4 in.
Thickness of shell	$\frac{17}{32}$	$\frac{15}{32}$	$\frac{1}{2}$	$\frac{17}{32}$	$\frac{5}{8}$	$\frac{23}{32}$	$\frac{25}{32}$
Thickness of heads	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$
Thickness of furnace	$\frac{11}{32}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{15}{32}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{15}{32}$
Weight	16800	20100	24100	27000	42300	48700	57400





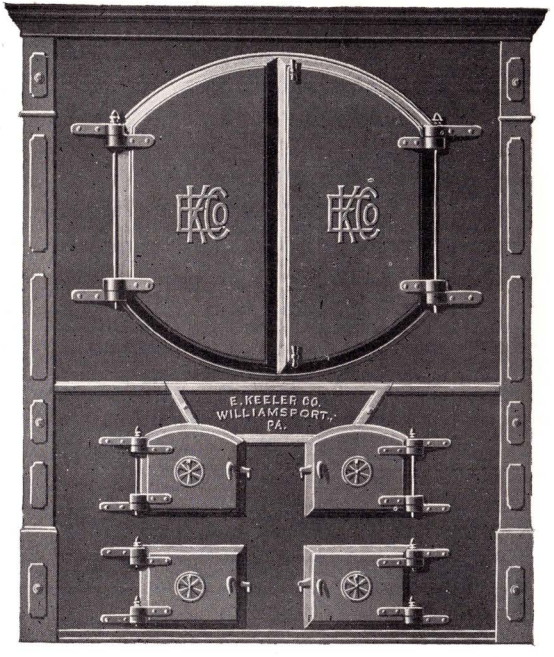
Vertical Marine Boilers

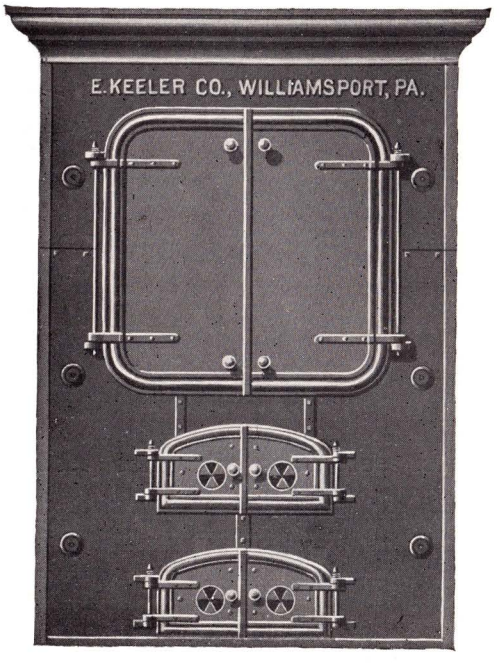
Submerged-Tube Vertical Marine Boilers

Fixtures consist of: Base plate, fire and ash doors, four holding-down lugs, grate bars, smoke hood, safety valve, steam gauge, water gauge, three gauge cocks, whistle, feed, check and blow-off valves. Suitable handholes are furnished in water leg and in shell of boiler above crown sheet. Boilers for higher pressure furnished when required.

SPECIFICATIONS:

Number of Size	1	2	3	4	5	6	7
Size of boiler, inches	24 x 40	26 x 50	30 x 52	36 x 58	42 x 62	48 x 72	54 x 76
Pressure allowed, pounds	120	120	120	120	120	120	120
Diameter of fire box, inches	20	22	26	32	38	42	48
Height of fire box, inches	18	18	18	18	18	20	22
Depth of cone, inches	8	12	14	16	18	22	22
Diameter of cone opening, inches	10	14	16	16	20	22	26
Number of 2-inch flues	31	36	64	91	120	160	186
Length of flues, inches	12	16	16	18	20	22	24
Depth of ash pit, inches	4	4	4	5½	5½	8	8
Thickness of shell, inches	¼	¼	¼	¼	5/16	3/8	7/16
Thickness of fire box, inches	9/32	9/32	9/32	9/32	9/32	5/16	5/16
Thickness of top head, inches	3/8	3/8	3/8	3/8	3/8	7/16	½
Thickness of flue sheets, inches	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Size of safety valve, inches	¾	1	1¼	1½	2	2½	2½
Size of blow-off, inches	¾	1	1¼	1½	1½	2	2
Weight complete, pounds	820	1195	1500	2085	2945	4170	5600

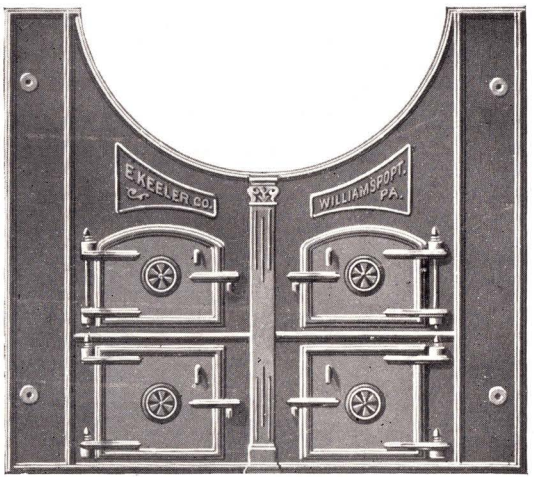


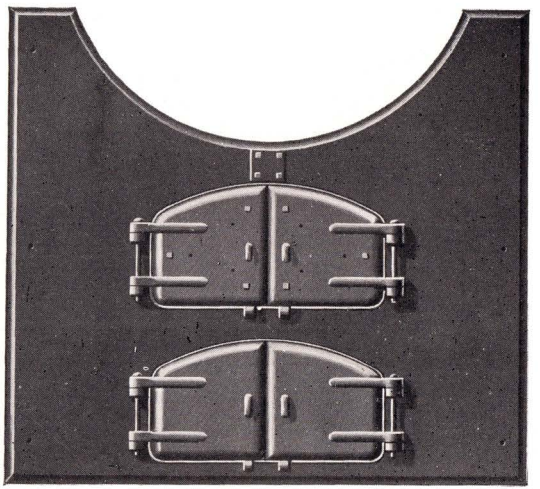


Full-Flush Boiler Fronts

No. 1

No. 2





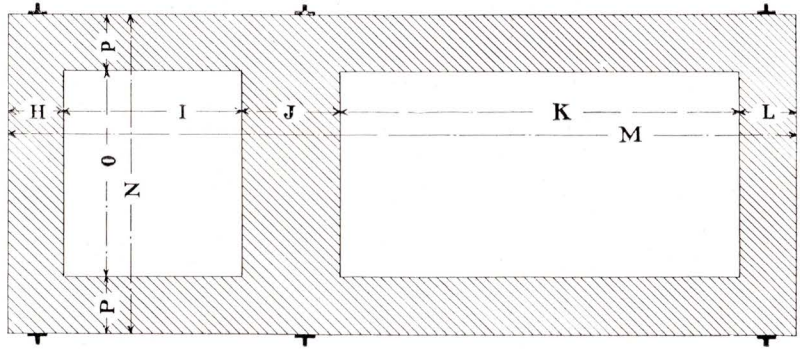
Half-Arch Boiler Fronts

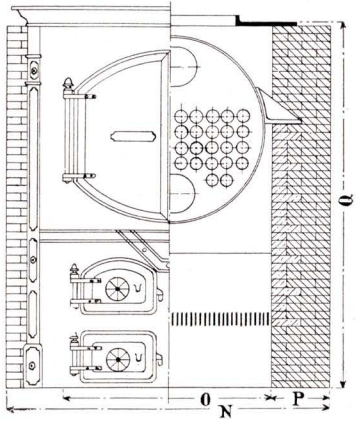
No. 1

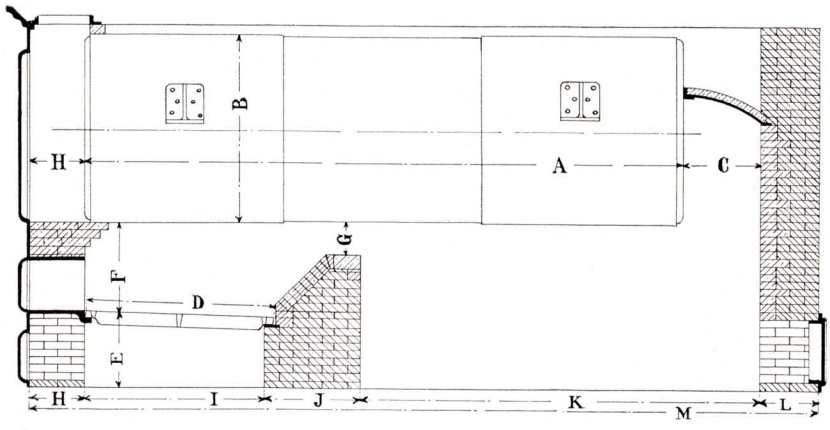
No. 2

Boiler Setting

Full-flush front







Settings for Boilers—Full-Flush Fronts

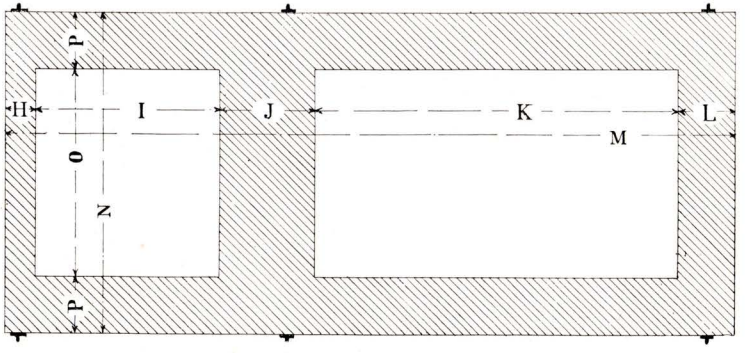
SPECIFICATIONS:

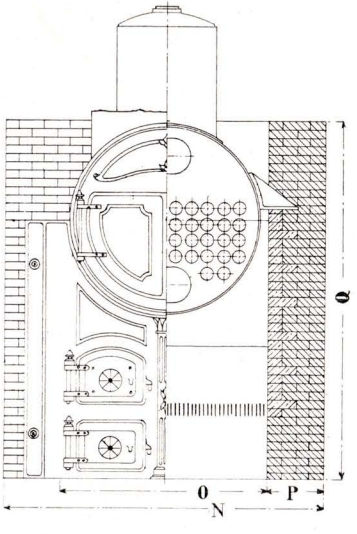
No. of Size	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	Fire Brick Required	Red Brick Required
	Ft.	In.	In.	In.	In.	In.	In.	In.	In.	In.	Ft. In.	In.	Ft.	Ft. In.	In.	In.	In.		
1	8	36	24	36	24	24	12	18	34	30	4 8	18	13	6 6	42	18	$88\frac{1}{4}$	1020	7250
2	10	36	24	36	24	24	12	18	34	30	6 8	18	15	6 6	42	18	$88\frac{1}{4}$	1150	8090
3	10	42	24	36	24	24	12	18	34	30	6 8	18	15	7 0	48	18	$94\frac{1}{4}$	1390	8770
4	10	44	24	36	24	24	12	18	34	30	6 8	18	15	7 2	50	18	$96\frac{1}{4}$	1410	8930
5	12	44	24	42	24	24	12	18	40	30	8 2	18	17	7 2	50	18	$96\frac{1}{4}$	1570	9870
6	14	44	24	48	24	24	12	18	46	30	9 8	18	19	7 2	50	18	$96\frac{1}{4}$	1720	10790
7	14	48	24	48	24	24	12	18	46	30	9 8	18	19	7 6	54	18	$100\frac{3}{8}$	1860	11260
8	12	54	24	48	24	28	12	18	46	30	7 8	18	17	8 0	60	18	$110\frac{3}{8}$	1880	11240
9	14	54	24	54	24	28	12	18	52	30	9 2	18	19	8 0	60	18	$110\frac{3}{8}$	2150	13020
10	14	60	24	54	24	28	12	18	52	30	9 2	18	19	8 6	66	18	$116\frac{1}{2}$	2280	13540
11	16	60	24	54	24	28	12	18	52	30	11 2	18	21	8 6	66	18	$116\frac{1}{2}$	2450	14750
12	16	66	24	60	24	28	12	18	58	30	10 8	18	21	9 0	72	18	$122\frac{5}{8}$	2500	15300
$12\frac{1}{2}$	18	66	24	66	24	28	12	18	64	30	12 2	18	23	9 0	72	18	$122\frac{5}{8}$	2690	16430
13	16	72	24	60	24	28	12	18	58	30	10 8	18	21	9 6	78	18	$128\frac{5}{8}$	2720	16280
14	18	72	24	72	24	28	12	18	70	30	11 8	18	23	9 6	78	18	$128\frac{5}{8}$	2900	17480
15	18	78	24	72	24	28	12	18	70	30	11 8	18	23	10 0	84	18	$134\frac{3}{4}$	3090	18300
16	18	84	24	72	24	28	12	18	70	30	11 8	18	23	10 6	90	18	$140\frac{3}{4}$	3170	19530
17	20	84	24	84	24	28	12	18	82	30	12 8	18	25	10 6	90	18	$140\frac{3}{4}$	3380	21000

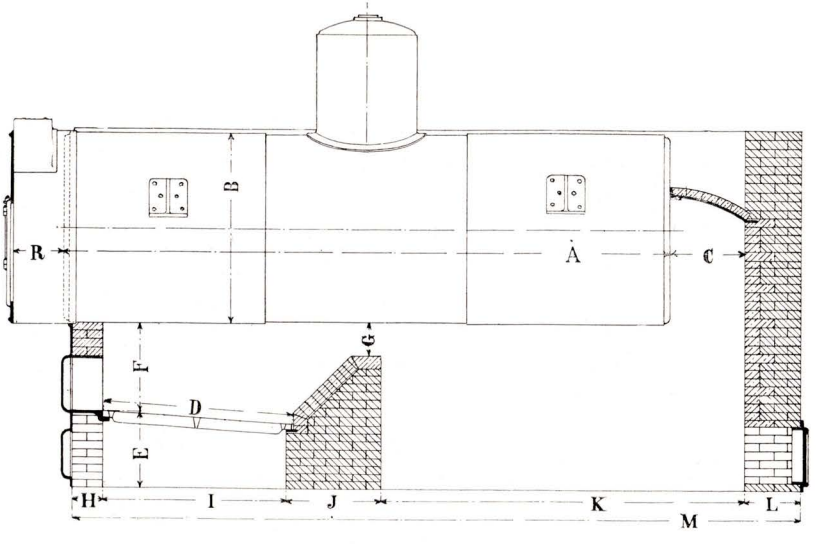
NOTE—All dimensions given above are for bituminous coal. For anthracite coal, the distance from grates to boiler is made 24 inches, and the length of grates is increased about 20 per cent. When two or more boilers are set in one battery, the center walls are 22 inches thick.

Boiler Setting

Half-arch front







Settings for Boilers—Half-Arch Front

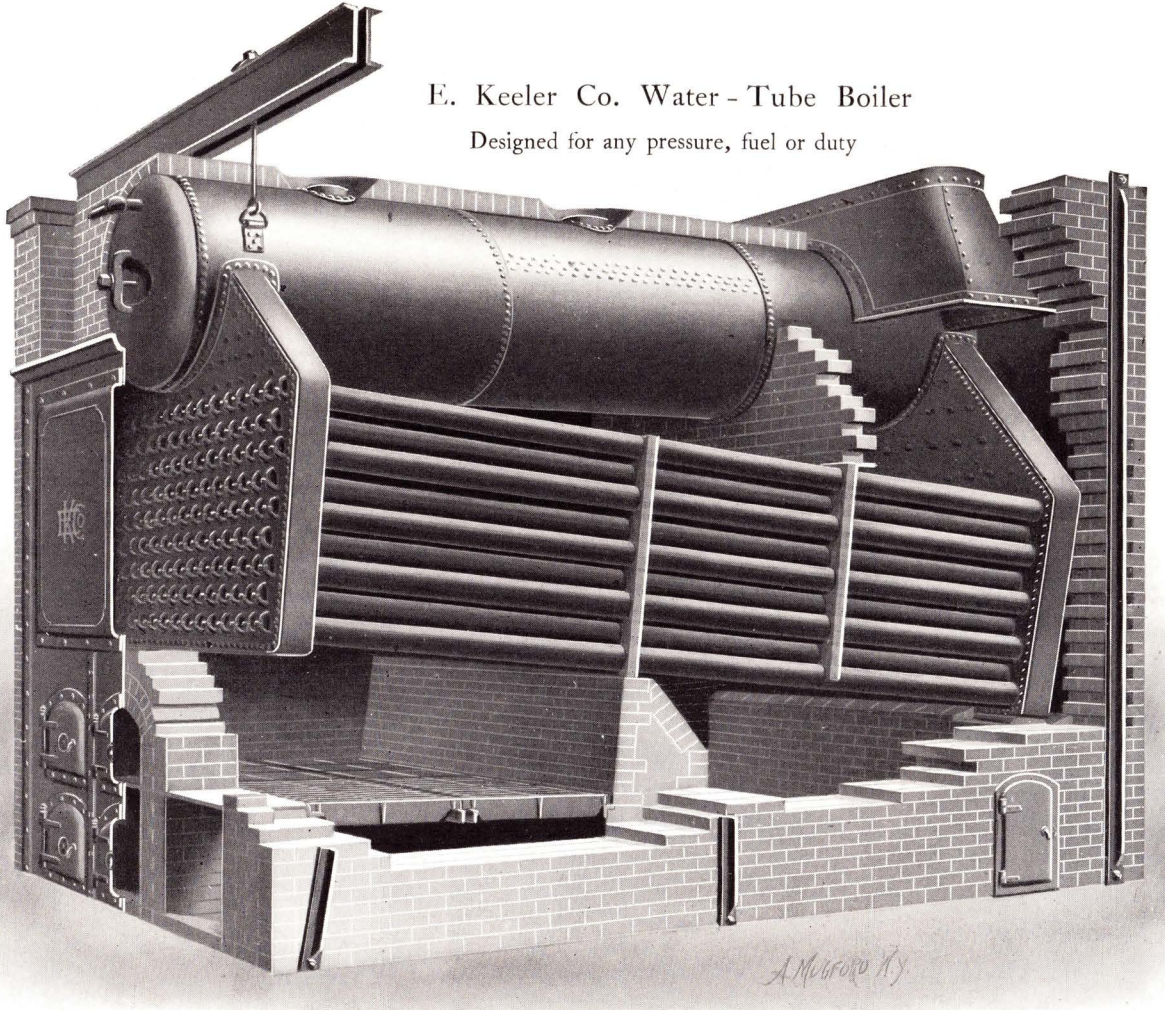
SPECIFICATIONS:

No. of Size	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	Fire Brick Required	Red Brick Required
	Ft.	In.	In.	In.	In.	In.	In.	In.	In.	In.	Ft. In.	In.	Ft. In.	Ft. In.	In.	In.	In.	In.		
1	8	36	24	36	24	24	12	9	34	30	3 6	18	11 1	6 6	42	18	88	16	1020	5930
2	10	36	24	36	24	24	12	9	34	30	5 6	18	13 1	6 6	42	18	88	16	1150	6800
3	10	42	24	36	24	24	12	9	34	30	5 6	18	13 1	7 0	48	18	93	16	1400	7250
4	10	44	24	36	24	28	12	9	34	30	5 5½	18	13 ½	7 2	50	18	99	16	1450	7720
5	12	44	24	42	24	28	12	9	40	30	6 11½	18	15 ½	7 2	50	18	99	16	1600	8660
6	14	44	24	48	24	28	12	9	46	30	8 5½	18	17 ½	7 2	50	18	99	16	1750	9550
7	14	48	24	48	25	28	12	9	46	30	8 6	18	17 1	7 6	54	18	104	16	1880	10180
8	12	54	24	48	23	28	12	9	46	30	6 5½	18	15 ½	8 0	60	18	108	16	1850	9760
9	14	54	24	54	23	28	12	9	52	30	7 11½	18	17 ½	8 0	60	18	108	16	2110	11550
10	14	60	24	54	22	28	12	9	52	30	7 11½	18	17 ½	8 6	66	18	114	16	2150	11600
11	16	60	24	54	22	28	12	9	52	30	9 11½	18	19 ½	8 6	66	18	114	16	2280	12700
12	16	66	24	60	24	28	12	9	58	30	9 5	18	19 0	9 0	72	18	122	16	2500	13550
12½	18	66	24	66	24	28	12	9	64	30	10 11	18	21 0	9 0	72	18	122	16	2700	14600
13	16	72	24	60	26	28	12	9	58	30	9 5	18	19 0	9 6	78	18	130	16	2660	14600
14	18	72	24	72	26	28	12	9	70	30	10 5	18	21 0	9 6	78	18	130	16	2900	15750

NOTE.—All dimensions given above are for bituminous coal. For anthracite, the grates are raised four inches and their length is increased about 20 per cent. When two or more boilers are set in one battery, the center walls are 22 inches thick.

E. Keeler Co. Water-Tube Boiler

Designed for any pressure, fuel or duty



The E. Keeler Co. Water-Tube Boiler.

Among the advantages of the best type of Water-Tube Boilers are their rapid generation and dryness of steam, simplicity of construction, economy of maintenance, fuel and space, and the absolute safety at which the highest pressures can be carried. Their quick-steaming properties especially adapt them for duty where the demands for steam are sudden and intermittent.

The E. Keeler Water-Tube Boiler is a combination of every feature which has been recognized as valuable in water-tube practice, with several new and decidedly meritorious departures. The life and efficiency of a water-tube boiler are almost entirely dependent on a constant and unimpeded circulation, and we are convinced that a comparison of our boiler with those of other makers will easily justify our claims for superiority in this respect. The simplicity and durability of construction, and the solid, compact form, recommend the E. Keeler Boiler to every user of steam. This boiler is made up of units of from 75 to 450 horse-power, two drums being used in the larger sizes.

Tubes and Headers.—The tubes are straight, the only form adapted for a water-tube boiler; any scale in the feed, no matter what the circulation may be, is necessarily deposited in the tubes, and if the tubes are curved it is difficult or impossible to remove it. The tubes (3½ or 4 inches by 16 or 18 feet) have a pitch of about one inch to the foot and are expanded into wrought-steel headers, in straight horizontal and staggered vertical rows, on 6-inch centers. Cast iron or cast steel has been proved impracticable for water-tube headers and we use for this purpose nothing but wrought steel. The construction of our header is unique in that the wrapper is flanged instead of the large front and back plates. This method obviates the strains inevitably produced in the faces of the headers when flanged. The headers are 8 inches deep inside and all open, affording the most complete and rapid circulation possible. They are without any return bends for the water to struggle through, or contracted nipples to throttle the rising stream. The throat is reinforced with three bridges of plate and extends half way around the shell.

Handholes.—The handholes are round, and joints are packed with rubber or copper gaskets. As the plates are inside of the header, increase in pressure only tends to tighten the joint without straining either the

bolt or the yoke. Handholes are one-quarter inch larger than the tubes, permitting worn tubes to be readily replaced.

Circulation.—The circulation is rapid and constant, the cooler water flowing downward through the rear header up through the whole nest of tubes to the front header and into the drum.

Feed.—The feed pipe is introduced into the front of the drum and passes through 10 feet of hot water, distributing the feed along its length, thus preventing any unequal contractions due to cold water on hot plates.

The feed may be carried into a mud drum located in the shell and made of sheet iron, where the mud is deposited and blown out through the rear head; or, if desired, the rear header may be extended 6 inches, forming a most effective mud drum, to which blow-off pipes are connected.

Support and Setting.—The front end of the shell is hung from two channels, which rest on the side walls. The rear header rests on two sets of expansion plates, making a perfectly elastic setting.

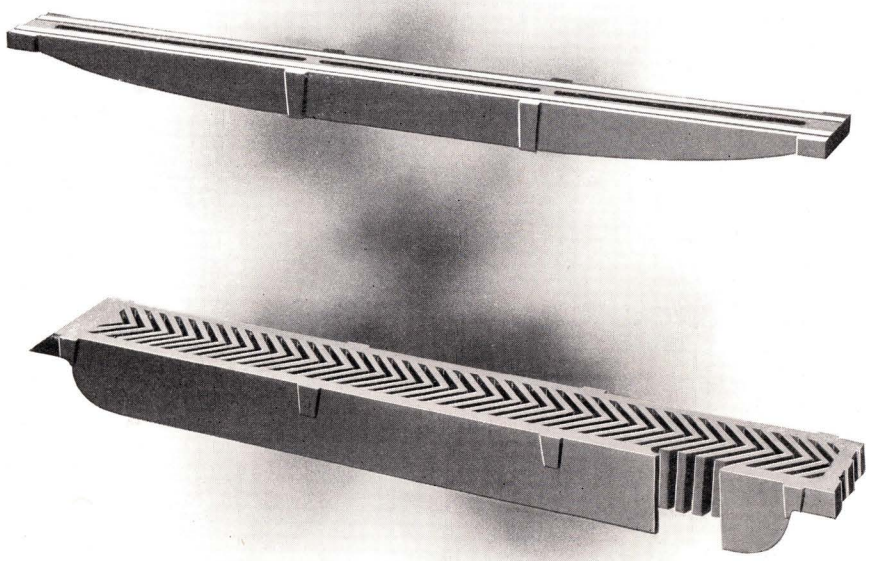
The front is attractively designed of sheet steel, with cast-iron doors and frames. As the front is sectional, it can be easily adapted to mechanical stoking apparatus. The rear door and frame are of angle iron and are lifted out when necessary to reach rear handholes. Side cleaning doors permit the most thorough and rapid cleaning and inspection. When specified, the holes in the stay bolts are enlarged sufficiently to admit a steam blower for cleaning tubes from soot collection.

Combustion.—The gases may be sent back over the bridge wall, to return among the tubes, giving up their heat along the entire length, then back under the shell to the uptake in the rear of the setting, special flat tile brick being laid on top and bottom row of tubes to make horizontal baffle walls.

When the vertical baffle walls are used, the gases pass up among the tubes, over the first wall, down and under the second wall, and through the tubes again to the uptake. The uptake is generally a cast-iron plate, having a long opening with circular ends, and a rib to take the breeching nozzle or bottom of a stack.

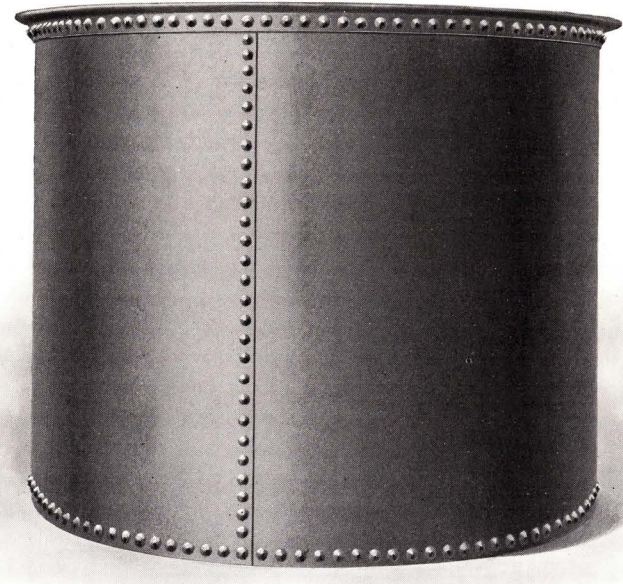
Grates.—The grates are as carefully proportioned as the tube surface, and may be either stationary or shaking, and specified for any grade of coal.

We design Water-Tube Boilers for any pressure, fuel or duty, and are always pleased to submit plans, estimates and specifications.



Grate Bars

We manufacture both shaking grates and stationary grate bars. The Tupper Bar (bottom cut), after years of trial, has proved to be the most economical stationary grate bar made. Having greater air space, it insures more thorough combustion, and has a life fully twice that of the Common Bar (top cut). Full description of our shaking grate on application.



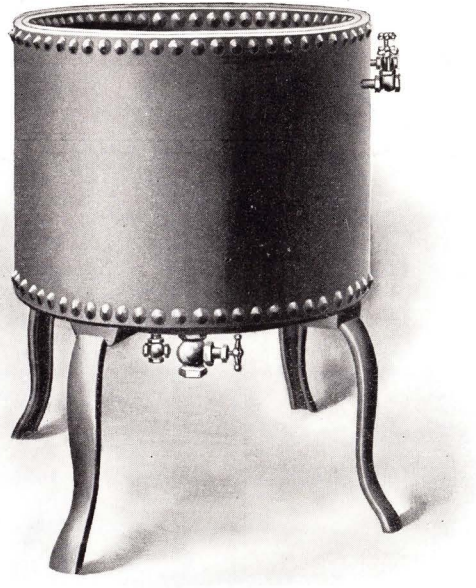
Open - Top Round Steel Tank

Open-Top Round Steel Tanks

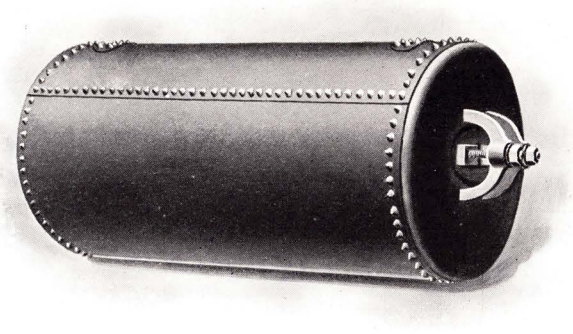
We make tanks of such a variety or sizes and shapes, and for so many uses, that we can give only space for a few of the more common ones. We give particular attention to ice tanks and chemical work, circulating tanks, steam and cooling pans, charcoal cans, acid retorts, and stills with iron or copper coils.

SPECIFICATIONS:

Number of Size.....	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Diameter, feet.....	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	12	12
Height, feet.....	2½	3	3	4	4½	5	5½	6	6	7	7	8	8	9	8	9	10	12
Thickness of shell, inches.	3/16	3/16	3/16	3/16	3/16	3/16	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	5/16	5/16	5/16	5/16
Thickness of head, inches.	3/16	3/16	3/16	3/16	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	5/16	5/16	5/16	5/16
Size of angle iron, inches.	1½	1½	1½	1½	2	2	2	2	2	2	2½	2½	2½	2½	2½	2½	2½	2½
Capacity, gallons	132	158	282	376	660	734	1163	1269	1727	2015	2632	3008	3807	4283	4700	5287	8460	10152
Weight, pounds	300	385	475	585	885	955	1600	1700	2100	2350	2800	3000	3730	4060	4965	5400	7250	8300



Steam Kettle



Receiving Tank

Receiving Tanks

Heads dished. No stays. Manhole in head or shell as desired. Flanges and openings as directed. Tested to 150 pounds pressure.

SPECIFICATIONS:

Number of Size	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Size of tank, feet	2½ x 3	2½ x 4	2½ x 5	2½ x 6	3 x 4	3 x 5	3 x 6	3½ x 6	3½ x 8	3½ x 10	4 x 8	4 x 10	4 x 12	4 x 8	4 x 10	4 x 12	4 x 14
Thickness of shell, inches	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	5/16	5/16	5/16	5/16
Thickness of head, inches	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	½	½	½	½
Weight	660	730	870	950	925	1050	1200	1400	1600	1850	1950	2250	2600	2350	2750	3150	3425
Capacity, gallons	110	145	18	220	210	260	313	430	575	720	750	940	1130	750	940	1130	1300

Steam-Jacket Kettles

The shells are made double, with a 2½-inch steam space between them. The shells and heads are of 60000 lbs. tensile strength steel plates throughout. We furnish with each outfit all necessary cocks for removing the condensed steam and drawing off the lard.

SPECIFICATIONS:

Number of Size	1	2	3	4	5
Diameter, inches	26	30	36	38	44
Depth, inches	20	24	28	30	32
Approximate weight, pounds	535	681	875	1100	1285
Capacity, gallons	50	75	100	150	200

Self-Supporting Steel Stacks

Self-Supporting Steel Stacks are fast superseding the old familiar brick chimney. When properly constructed and designed, they are superior in draft, durability and safety, and the first cost is considerably less than a brick chimney.

There is no leakage of air inward and consequent checking of draft unavoidable in brick structures, and the column of ascending gases has such a high velocity that the heat lost by radiation, even when the stack is entirely unlined, has little or no effect upon the draft.

A steel stack is quickly erected, requires little space, and being less in weight is much safer on loose soil than a heavier construction.

A Self-Supporting Steel Stack is modern and business-like in appearance. The slender shaft flaring at the base and capped with a well-proportioned astragal is a novelty sure to attract attention.

We have been building this class of chimneys or smoke stacks for 20 years, and have never known them to fail in any respect. As usually constructed they are furnished with taper or bell bottom with heavy cast-iron base plate, anchored to concrete or stone foundation, bolts being of sufficient length and strength to insure a factor of safety of 6 to 1 against tornado pressure.

We have designed and erected some of the largest self-supporting stacks in this country and abroad. We also furnish and erect guyed and semi-guyed stacks, and are at all times pleased to submit plans and specifications for this class of work.

Standpipes

We build and erect Standpipes for water works in accordance with the most modern engineering principles.

Ocean City, N. J., Standpipe

Cork, Ireland, Self-Supporting Steel Stack

Height of Self-Supporting Steel Stacks and Commercial Horse-Power of Boilers

Diameter in Inches	HEIGHT IN FEET											Effective Area, Square Feet	Actual Area, Square Feet
	50	60	70	80	90	100	110	125	150	175	200		
	COMMERCIAL HORSE-POWER												
30	84	92	100	107	113	119	.....	.....	.....	.....	.....	3.58	4.91
33	105	115	125	133	140	149	.....	.....	.....	.....	.....	4.48	5.94
36	128	141	152	163	173	182	191	.....	.....	.....	.....	5.47	7.07
39	154	168	183	196	208	219	229	.....	.....	.....	.....	6.57	8.30
42	182	200	216	231	245	258	271	288	.....	.....	.....	7.76	9.62
48	.....	269	290	311	330	348	365	389	.....	.....	.....	10.44	12.57
54	.....	348	376	402	427	449	472	503	551	.....	.....	13.51	15.90
60	.....	436	471	503	536	565	593	662	692	748	.....	16.98	19.64
66	.....	.....	579	620	658	694	728	776	849	918	981	20.83	23.76
72	.....	.....	698	746	792	835	876	934	1023	1105	1181	25.08	28.27
78	.....	.....	.....	885	949	990	1038	1107	1212	1310	1400	29.73	33.18
84	.....	.....	.....	1035	1098	1157	1214	1294	1418	1531	1637	34 76	38.48
90	.....	.....	.....	.....	1269	1338	1403	1496	1639	1770	1893	40.19	44.18
96	.....	.....	.....	.....	.....	1532	1606	1712	1876	2027	2167	46.01	50.27
100	.....	.....	.....	.....	.....	.....	1760	1865	2043	2197	2359	50.11	54.54
104	.....	.....	.....	.....	.....	.....	1899	2024	2218	2395	2560	54.39	59.00
108	.....	.....	.....	.....	.....	.....	2051	2190	2399	2591	2770	58.83	63.62
112	.....	.....	.....	.....	.....	.....	.....	2323	2588	2795	2988	63.46	68.42
118	.....	.....	.....	.....	.....	.....	.....	2632	2883	3114	3339	70.71	75.94
120	.....	.....	.....	.....	.....	.....	.....	2725	2986	3225	3447	73.22	78.54
124	.....	.....	.....	.....	.....	.....	.....	2915	3193	3449	3687	78.31	83.86
130	.....	.....	.....	.....	.....	.....	.....	3165	3467	3745	4004	85.04	90.76
136	.....	.....	.....	.....	.....	.....	.....	.....	3868	4178	4466	94.85	100.88
142	.....	.....	.....	.....	.....	.....	.....	.....	4305	4567	4886	103.69	109.98
150	.....	.....	.....	.....	.....	.....	.....	.....	4719	5097	5448	115.72	122.72